

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Prior Application: S. IMASU et al
Serial No. 09/048,054
Filed: March 26, 1998

Group Art Unit: 2841
Examiner: J. Vigushin
For: PROCESS FOR MOUNTING ELECTRONIC
DEVICE AND SEMICONDUCTOR DEVICE

PRELIMINARY AMENDMENT

Assistant Commissioner of Patents
Washington, D.C. 20231

Sir:

Prior to examination on the merits, please amend the
above-identified application as follows:

IN THE SPECIFICATION:

Page 7, line 18, after "board)" insert --of the bump
electrodes--.

Page 8, line 2, change "Fig. 4 is sections" to --Figs.
4(A), 4(B) and 4(C) are sectional views--.

Page 8, line 2, change "Fig. 4 is sections" to
--Figs. 4(A), 4(B) and 4(C) are sectional views--;

line 25, change "B - B" to --II - II--.

Page 9, line 2, change "C - C" to --III - III--;

line 22, change "A - A" to --I - I--.

Page 22, line 18, after "(a section)." insert
--In this case also, as shown in Fig. 11, the passivation film
5 is not formed between the semiconductor chip 10 and the soft
layer 3.--

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Page 27, line 18, change "B - B" to --II - II--;

line 20, change "C - C" to --III - III--.

IN THE CLAIMS

Cancel claim 1, and add new claims 14-22 as follows:

--14. An electronic device comprising a first electronic device, second electronic device and a wiring board;

said first electronic device comprising:

a semiconductor chip having a first surface and a second surface which is opposite to said first surface, elements and a plurality of external terminals formed on said first surface, a plurality of bumps formed on said external terminals, respectively;

said second electronic device comprising:

a plurality of electrodes;

said wiring board comprising:

a main surface, an insulating layer formed over said main surface of said wiring board, a plurality of electrode pads formed on said insulating layer and a passivation film formed over said insulating layer;

wherein said first electronic device is fixed to said wiring board through an adhesive and said plurality bumps being electrically connected to said plurality of electrode pads, respectively;

wherein said plurality of electrodes of said second electronic device are electrically and mechanically connected to said plurality of electrode pads by soldering, respectively; and

wherein said passivation film is formed around each of said plurality of electrode pads to which said electrodes of said second electronic device are electrically and mechanically connected;

wherein said passivation film is formed between said plurality of electrode pads to which said electrodes of said second electronic device are electrically and mechanically connected;

wherein said passivation film is formed between said second electronic device and said insulating layer; and

wherein said passivation film is not formed between said first electronic device and said insulating layer.

--15. An electronic device according to claim 14, further comprising recesses in said plurality of electrode pads, and

wherein said plurality of bumps are electrically connected to said plurality of electrode pads in said recesses, respectively.

--16. An electronic device according to claim 15, wherein said wiring board is comprised of rigid substrate that is more rigid than said insulating layer.

--17. An electronic device according to claim 14, wherein said plurality of bumps are fixed to said plurality of external terminals of said semiconductor chip and pressed to said plurality of electrode pads on said insulating layer.

--18. An electronic device according to claim 14, wherein said insulating layer is made of a material having a smaller coefficient of thermal expansion than that of said adhesive.

--19. An electronic device comprising a first electronic device, second electronic device and a wiring board;

said first electronic device comprising:

a semiconductor ship having a first surface and a second surface which is opposite to said first surface, a plurality of semiconductor elements and a plurality of external terminals formed on said first surface, a plurality of bumps respectively fixed to said plurality of external terminals;

said second electronic device comprising:

a plurality of electrodes;

said wiring board comprising:

a main surface, an insulating layer formed over said main surface, a plurality of electrode pads formed on said insulating layer;

wherein said first electronic device is fixed to said wiring board through an adhesive over said insulating layer, and said plurality of bumps being pressed and electrically connected to said plurality of electrode pads, respectively;

wherein a distance between said electrode pads and said first surface of said semiconductor chip is smaller than the thickness of said passivation film;

wherein said plurality of electrodes of said second electronic device are electrically and mechanically connected to said plurality of electrode pads by soldering, respectively; and

wherein said passivation film is formed between each of said plurality of electrode pads to which said electrodes of said second electronic device are electrically and mechanically connected.

--20. An electronic device according to claim 19, further comprising recesses in said plurality of electrode pads, and

wherein said plurality of bumps are electrically connected to said plurality of electrode pads in said recesses, respectively.

--21. An electronic device comprising a first electronic device, a second electronic device and a wiring board;

said first electronic device comprising:

a semiconductor chip having a first surface and a second surface which is opposite to said first surface, a plurality of semiconductor elements and a plurality of external terminals formed on said first surface, a plurality of bumps formed on said plurality of external terminals, respectively;

said second electronic device comprising:

a plurality of electrodes;

said wiring board comprising:

a main surface, an insulating layer formed over said main surface, a plurality of electrode pads formed on said insulating layer and a passivation film formed on said insulating layer;

wherein said first electronic device is fixed to said wiring board through an adhesive over said insulating layer, and said plurality of bumps being electrically connected to said plurality of electrode pads, respectively.

wherein a distance between said insulating layer and said first surface of said semiconductor chip is smaller than a distance between said insulating layer and a upper surface of said passivation film;

wherein said plurality of electrodes of said second electronic device are electrically and mechanically connected to said plurality of electrode pads by soldering, respectively; and

wherein said passivation film is formed between each of said plurality of electrode pads to which said electrodes of said second electronic devices are electrically and mechanically connected.

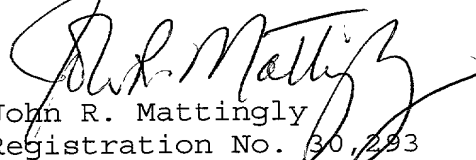
--22. An electronic device according to claim 21, further comprising recesses in said plurality of electrode pads, and

wherein said plurality of bumps are electrically connected to said plurality of electrode pads in said recesses, respectively.--

REMARKS

Examination is requested.

Respectfully submitted,



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